What is claimed:

1. A method for encoding a digital signal into a scalable bitstream comprising:

-quantizing the digital signal, and encoding the quantized signal to form a core-layer bitstream;

-performing an error mapping based on the digital signal and the core-layer bitstream to remove information that has been encoded into the core-layer bitstream, resulting in an error signal;

-bit-plane coding the error signal based on perceptual information of the digital signal, resulting in an enhancement-layer bitstream, wherein the perceptual information of the digital signal is determined using a perceptual model; and

-multiplexing the core-layer bitstream and the enhancement-layer bitstream, thereby generating the scalable bitstream.

2. The method of claim 1, further comprising:

- transforming the digital signal into a suitable domain, wherein the transformed signal is quantized to form the quantized signal before encoding the quantized signal.

3. The method of claim 1 or 2, wherein the perceptual information of the digital signal is further multiplexed with the core-layer bitstream and the enhancement-layer bitstream to generate the scalable bitstream.

4. The method of claim 2, wherein the digital signal is transformed to a transformed digital signal using an integer Modified Discrete Cosine Transform.

5. The method of claim 4, wherein the transformed signal is normalized to approximate the output of a MDCT filterbank.

6. The method of any one of claims 1 to 5, wherein the digital signal or the transformed digital signal is quantized and encoded according to the Moving Pictures Expert Group (MPEG) Advanced Audio Coding (AAC) specification.

7. The method of any one of claims 1 to 6, wherein the error mapping is performed by subtracting the lower quantization threshold corresponding to each quantized value of the quantized signal from the digital signal or the transformed digital signal, thereby generating the error signal.

8. The method of any one of claims 1 to 7, wherein the psychoacoustic model is used as the perceptual model for determining the perceptual information of the digital signal.

9. The method of any one of claims 1 to 8, wherein the error signal is represented in bit-planes comprising a plurality of bit-plane symbols, and wherein the bit-planes are shifted based on the perceptual information of the digital signal, such that bit-planes which are more perceptually important are coded first when the bit-planes are scanned and coded in a consecutive sequence during bit-plane coding of the error signal.

10. The method of any one of claims 1 to 8, wherein the error signal is represented in bit-planes comprising a plurality of bit-plane symbols, and wherein the bit-planes and the bit-plane symbols are scanned and coded during bit-plane coding of the error signal in a sequence based on the perceptual information

of the digital signal, such that bit-plane symbols of the bit-planes which are more perceptually important are coded first.

11. The method of claim 9 or 10, wherein at least one of the following information is determined as the perceptual information of the digital signal by the perceptual model:
-the bit-plane of the error signal which the bit-plane coding of the error signal starts M(s); and
-the Just Noticeable Distortion (JND) level of the digital signal, wherein s correspond to a frequency band of the digital signal or the transformed digital signal.

12. The method of claim 11, wherein perceptual significance Ps(s) of the digital signal is further determined as the perceptual information, the perceptual significance is determined by:
- determining the bit-plane of the error signal corresponding to the JND level $\tau(s)$ of the digital signal,
- subtracting the bit-plane of the error signal corresponding to the JND level $\tau(s)$ of the digital signal from the bit-plane of the error signal which the bit-plane coding of the error signal starts M(s), thereby determining the perceptual significance Ps(s), wherein the perceptual significance Ps(s) is used to control the scanning and coding sequence of at least the bit-planes or the bit-plane symbols of the bit-planes.

13. The method of claim 12, wherein the perceptual significance Ps(s) is normalized by:
- defining a common perceptual significance Ps(s)_common based on a function of the perceptual significance Ps(s); and

- subtracting the common perceptual significance Ps(s)_common from the perceptual significance Ps(s), thereby generating the normalized perceptual significance Ps'(s), wherein for frequency band s for which the quantized values are not all zero, the value of the perceptual significance Ps(s) is set to the value of the common perceptual significance Ps_common, and

wherein for frequency band s for which the quantized values are all zero, the normalized perceptual significance Ps'(s) is multiplexed with the core-layer bitstream and the enhancement-layer bitstream to generate the scalable bitstream.

14. The method of claim 11, wherein the bit-plane of the error signal which the bit-plane coding of the error signal starts is determined from the maximum quantization interval used in the frequency band s for quantizing the digital signal or the transformed signal.

15. A encoder for encoding a digital signal into a scalable bitstream, comprising:

-a quantization unit for quantizing the digital signal, and encoding the quantized signal to form a core-layer bitstream;

-an error mapping unit for performing an error mapping based on the digital signal and the core-layer bitstream to remove information that has been encoded into the core-layer bitstream, resulting in an error signal;

-a perceptual bit-plane coding unit for bit-plane coding the error signal based on perceptual information of the digital signal, resulting in an enhancement-layer bitstream, wherein the perceptual information of the digital signal is determined using a perceptual model; and

-a multiplexing unit for multiplexing the core-layer bitstream and the enhancement-layer bitstream, thereby generating the scalable bitstream.

16. A computer readable medium, having a program recorded thereon, wherein the program, when executed by a computer, makes the computer perform a procedure for encoding a digital signal into a scalable bitstream, the procedure comprising:
-quantizing the digital signal, and encoding the quantized signal to form a core-layer bitstream;
-performing an error mapping based on the digital signal and the core-layer bitstream to remove information that has been encoded into the core-layer bitstream, resulting in an error signal;
-bit-plane coding the error signal based on perceptual information of the digital signal, resulting in an enhancement-layer bitstream, wherein the perceptual information of the digital signal is determined using a perceptual model; and
-multiplexing the core-layer bitstream and the enhancement-layer bitstream, thereby generating the scalable bitstream.

17. A computer program element which, when executed by a computer, makes the computer perform a procedure for encoding a digital signal into a scalable bitstream, the procedure comprising
-quantizing the digital signal, and encoding the quantized signal to form a core-layer bitstream;
-performing an error mapping based on the digital signal and the core-layer bitstream to remove information that has been encoded into the core-layer bitstream, resulting in an error signal;

-bit-plane coding the error signal based on perceptual information of the digital signal, resulting in an enhancement-layer bitstream, wherein the perceptual information of the digital signal is determined using a perceptual model; and

-multiplexing the core-layer bitstream and the enhancement-layer bitstream, thereby generating the scalable bitstream.

18. A method for decoding a scalable bitstream into a digital signal comprising:

- de-multiplexing the scalable bitstream into a core-layer bitstream and an enhancement-layer bitstream;
- decoding and de-quantizing the core-layer bitstream to generate a core-layer signal;
- bit-plane decoding the enhancement-layer bitstream based on perceptual information of the digital signal; and
- performing an error mapping based on the bit-plane decoded enhancement-layer bitstream and the de-quantized core-layer signal, resulting in a reconstructed transformed signal, wherein the reconstructed transformed signal is the digital signal.

19. The method of claim 18, further transforming the reconstructed transformed signal into a reconstructed signal, wherein the reconstructed signal is the digital signal.

20. The method of claim 18 or 19, wherein the perceptual information of the digital signal is obtained from the de-multiplexing of the scalable bitstream.

21. The method of claim 19 or 20, wherein the core-layer signal and the enhancement-layer signal are transformed using an integer Modified Discrete Cosine Transform (MDCT).

22. The method of any one of claims 18 to 21, wherein the core-layer bitstream is decoded and de-quantized according to the Moving Pictures Expert Group (MPEG) Advanced Audio Coding (AAC) specification.

23. The method of any one of claims 18 to 22, wherein the error mapping is performed by adding the lower quantization threshold used for de-quantizing the transformed signal and the bit-plane decoded enhancement-layer bitstream, thereby generating the enhancement-layer signal.

24. The method of any one of claims 18 to 23, wherein the enhancement-layer bitstream is bit-plane decoded to generate a plurality of bit-planes comprising a plurality of bit-plane symbols in a consecutive sequence, and the bit-planes are shifted based on the perceptual information of the digital signal to generate the bit-plane decoded enhancement-layer bitstream.

25. The method of any one of claims 18 to 23, wherein the enhancement-layer bitstream is bit-plane decoded to generate a plurality of bit-planes comprising a plurality of bit-plane symbols in a sequence based on the perceptual information of the digital signal, thereby generating the bit-plane decoded enhancement-layer bitstream.

26. The method of claim 24 or 25, wherein at least one of the following information is received as the perceptual information of the digital signal:
-the bit-plane which corresponds to the enhancement-layer bitstream when the bit-plane decoding of the enhancement-layer

bitstream starts, which bit-plane is specified by a number M(s); and

-the Just Noticeable Distortion (JND) level of the digital signal, wherein s correspond to a frequency band of the digital signal.

27. The method of claim 26, wherein the bit-plane which corresponds to the enhancement-layer bitstream when the bit-plane decoding of the enhancement-layer bitstream starts M(s) is determined from the maximum quantization interval used in the frequency band s for de-quantizing the core-layer bitstream.

28. A decoder for decoding a scalable bitstream into a digital signal comprising:

- a de-multiplexing unit for de-multiplexing the scalable bitstream into a core-layer bitstream and an enhancement-layer bitstream;
- a de-quantization unit for decoding and de-quantizing the core-layer bitstream to generate a core-layer signal;
- a bit-plane decoding unit for bit-plane decoding the enhancement-layer bitstream based on perceptual information of the digital signal; and
- an error mapping unit for performing an error mapping based on the bit-plane decoded enhancement-layer bitstream and the de-quantized core-layer signal, resulting in a reconstructed transformed signal, wherein the reconstructed transformed signal is the digital signal.

29. A computer readable medium, having a program recorded thereon, wherein the program, when executed by a computer, makes the computer perform a procedure for decoding a scalable bitstream into a digital signal, the procedure comprising:

- de-multiplexing the scalable bitstream into a core-layer bitstream and an enhancement-layer bitstream;
- decoding and de-quantizing the core-layer bitstream to generate a core-layer signal;
- bit-plane decoding the enhancement-layer bitstream based on perceptual information of the digital signal; and
- performing an error mapping based on the bit-plane decoded enhancement-layer bitstream and the de-quantized core-layer signal, resulting in a reconstructed transformed signal, wherein the reconstructed transformed signal is the digital signal.

30. A computer program element which, when executed by a computer, makes the computer perform a procedure for decoding a scalable bitstream into a digital signal, the procedure comprising:
- de-multiplexing the scalable bitstream into a core-layer bitstream and an enhancement-layer bitstream;
- decoding and de-quantizing the core-layer bitstream to generate a core-layer signal;
- bit-plane decoding the enhancement-layer bitstream based on perceptual information of the digital signal; and
- performing an error mapping based on the bit-plane decoded enhancement-layer bitstream and the de-quantized core-layer signal, resulting in a reconstructed transformed signal, wherein the reconstructed transformed signal is the digital signal.